

# BEDSIDE MEDICINE FOR BEDSIDE DOCTORS

An Open Forum for brief discussions of the workaday problems of the bedside doctor. Suggestions of subjects for discussions invited.

## ACUTE EAR DISEASE IN CHILDHOOD

WALLACE B. SMITH, M. D. (490 Post Street, San Francisco).—*Symptoms.* In any discussion on the symptoms of acute ears in childhood, it is well to bear in mind that there is greater variability in the degree, as well as in the combination of symptoms in this, than in perhaps any other of the acute inflammatory diseases. We ordinarily divide the symptoms into those due to the reaction of the general system to the infection, and those due to the reaction of the middle ear and neighborhood. The general symptoms are similar to those of any of the acute inflammatory diseases, fever, malaise, anorexia, increased white blood count, with percentage increase of the polymorphonuclears; the fever being highest in the afternoon and ranging as high as 105 degrees. The local symptoms are pain, discoloration of the drum, loss of its details, and bulging. The discoloration varies from lack of luster to marked redness. There are two variations of importance: one in which blebs cover a portion or whole of the drum, and sometimes extend on to the external canal; the other, the grey drum. The former is usually indicative of the influenza organism as the cause of the otitis, and by the latter is meant the lusterless, grey-colored drum, usually due to sodden epithelium. It is easily wiped away, and the red drum is found underneath. The loss of details of the drum and bulging do not need further elaboration.

Fever is the outstanding symptom during any and all stages of an acute infection of the middle ear and mastoid, and any of the complications arising from it. When one is called to see a patient with fever of fairly rapid onset, and associated with severe pain in the ear and reddened drum, the diagnosis is simple and needs no discussion. If the fever is of more gradual onset, the appearance of the drum is pale, lusterless, details present, and with little or no complaint of pain, the diagnosis is less obvious. This condition may continue for several days with no apparent change save an increase in fever to 103-105 degrees. A close inquiry will usually bring out the history of a previous acute cold.

Most of us approach these patients with the feeling of arriving at a diagnosis by considering and excluding the following: (a) pyelitis, if the patient is a girl, and carry in our minds that there may elapse a period of from one to four or five days in a pyelitis before pus cells are present in sufficient quantity for diagnosis; (b) pneumonia, and that we may not be able to detect a central pneumonia until consolidation comes nearer the surface or recourse is had to the x-ray; (c) tonsillitis, which is more easily diagnosed and is of short duration—three to five days.

Once discharge from the middle ear has been established either by spontaneous rupture or incision of the drum, the fever usually recedes but does not become normal, and we enter a period of freedom from pain, a profuse discharge, and a general improvement. The great majority of cases go on to recovery from this point.

If from any of several reasons, such as virulence of the infecting organism, lowered resistance of the patient, anatomical formation of the middle ear, eustachian, or pneumatization of the temporal bone, we are to have a mastoiditis, we should bear in mind certain facts which, from long experience and careful observation, have become landmarks in otology. The common pathologic form of mastoiditis is the acute coalescent type which takes two full weeks to develop, and for this reason the third week is the week of complications; so that symptoms during and after the third week have greater significance than during the time before discharge is established and for almost two weeks afterward. The high fever before perforation or incision means less than a fever of, say, 102 degrees after the second week. Mastoid tenderness is rather generally present early in the infection, even before rupture, and does not mean surgical mastoiditis. It usually subsides within a few days. The tenderness which develops after two weeks, however, has other significance, especially if certain anatomical points of tenderness are observed; though not all points are equally involved, and not all are necessarily involved at the same time. They are the tip of the mastoid, the point corresponding to the antrum, the point corresponding to the superior border of the petrous bone, the region posterior to the course of the sigmoid sinus before it turns up to form the bulb, and the posterior portion of the zygoma in front of the ear. There also develops a certain character of the pus which is an aid, but is rather an intangible sign. For instance, pus from the breaking down of the intercellular bone does not contain mucus; the mucoid element in the ear discharge is contributed by the mucous membrane of the middle ear. The pus of a coalescent type of mastoiditis has a larger element of bony pus than mucoid material, though both are present. The bone pus is of cream-like consistence, yellowish grey, and not having mucin does not "string" out when wiped away with cotton-tipped applicator; and, the third week increase in quantity of the discharge will indicate more than just a middle-ear involvement. The sagging of the posterior superior wall which occurs at this time must extend the length of the canal from the drum outward. If it is located only in the cartilaginous portion of the canal, it has no relation to mastoiditis. And, lastly, the continuous diag-

nostic exclusion of other diseases showing pyogenic temperature curves, attention being called again to those previously mentioned, namely, pyelitis, pneumonia, and tonsillitis. If the condition has been unilateral, the good ear must be seen daily. Often there is involvement of the cervical gland by the original infection which caused the otitis. These cases have at times been the cause of a close differential diagnostic study in probable mastoiditis, as the problem may hang on what is the cause of the fever, the middle ear—mastoid, or the cervical adenitis.

Blood counts give information which is of value, but like that derived from blood culture and x-ray studies, it should rarely, if ever, be the deciding point of a surgical interference either pro or con in the coalescent type of mastoiditis.

The other pathologic type of mastoiditis, known as the osteothrombophlebitic type, in which the small vessels of the mastoid are early filled with thrombi—these in turn acting as pathways of infection to the intracranium and to the blood stream—run such a stormy course that diagnosis and procedure are usually obvious. The fever is very high, the pain of the middle ear infection is also in the mastoid, the discharge is serosanguineous and profuse, there is exquisite tenderness over the whole mastoid and beyond, general prostration is present with severe headache on the affected side, blood count high, percentage of polynuclears high, and if the blood culture is taken at the right time it is apt to be positive. And as it may run a fatal course before there is any breaking down of the bone, the x-ray will not be a benefit, nor will there be sagging of the posterior superior wall. This clinical picture is different from that of a severe otitis media in which we have a continuation of the fever for four or five days after the establishment of drainage. In the otitis media the fever is the only outstanding symptom and the other symptoms are not out of their customary proportion. Fortunately the osteothrombophlebitic type of mastoiditis is only met with occasionally, and for that reason in our daily practice it does not occupy the place of importance of the coalescent type.

Local conditions around the ear which resemble mastoiditis and which must be excluded, are:

(a) Swelling and redness on the mastoid process due to infection of the postauricular lymph node to which infection drains from the scalp on that half of the head. Any comb scratch, sore, or scalp break may give entry to the lymph stream of an infection sufficient to infect this node. The consequent swelling and redness of the soft parts over the mastoid are typical of an acute mastoiditis, with rupture through the mastoid cortex and soft part involvement. In lymph node infection the drum is normal, as is the hearing, and there is no discharge.

(b) Extension of the swelling of an external otitis from the external canal over the mastoid bone.

(c) Erysipelas starting in the folds of skin around the cartilage of the external ear which will produce a swelling simulating that due to

mastoiditis. Erysipelas is not an infrequent visitor to this region, and usually runs a mild course.

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SIMON JESBERG, M. D. (500 South Lucas Avenue, Los Angeles).—*Treatment.* The incidence of acute middle ear infections is much greater in children than in adults. This is due probably to the greater susceptibility of children to upper respiratory tract infections, and the preponderance of lymphoid tissue in the throat and epipharynx, as well as a greater patency of the eustachian tubes. In addition, contagious diseases, mainly measles and scarlet fever, are more prevalent in childhood. These are often complicated by ear involvement.

The diagnosis of middle-ear involvement is made by direct inspection of the drum membrane. Redness of the drum with obliteration of the landmarks can be taken as a reliable sign of middle ear involvement. In very young children the drum does not bulge as much as in older children and, therefore, this sign is often lacking, or little in evidence. On the other hand, the systemic symptoms are much more pronounced in younger children, fever is often high and convulsions may occur. There are all gradations of severity of infection, showing as signs from a mild hyperemia of the drum to signs of intense inflammation and with systemic symptoms in accord.

When the diagnosis of middle ear infection is definitely made, the course of treatment is indicated by the severity of symptoms and the local findings. If there is only a mild systemic reaction and the drums show no great change, one is justified in waiting and using some palliative treatment, the favorite being phenolized glycerin. A few drops of five per cent phenol in glycerin are warmed and instilled into the ear canal. This will allay the earache in most mild infections. If these symptoms do not abate in twenty-four hours, or if there is evidence that the condition is getting worse, such palliative measures should not be further relied upon.

Middle ear infections, except those mild inflammations of transient duration, demand drainage and the sooner this is instituted the quicker will the disease be cured. To deliberately wait for spontaneous rupture of the drum to occur is absolutely unjustifiable. While nature thus attempts to relieve the condition, there is grave danger of extension to the mastoid cells, an extension that probably would not happen if early artificial drainage had been provided by a drum incision. Moreover, a drum properly incised never fails to heal after the infection is cleared up, but spontaneous ruptures of the drum often leave a permanent opening. A good rule to follow is: "When in doubt, open the drums." This applies particularly to ear infections in young children; and while the symptoms are perhaps never severe, still there is persisting evidence of middle ear inflammation. Sometimes the severity of the systemic symptoms are out of all proportion to the local ear findings, yet when the drum is incised the whole picture takes a definite turn for the better.

*Anesthesia.*—Ether is my preference. It is given with an open mask or a handkerchief over the

mouth and nose. Induction is as rapid as possible without suffocation. In about sixty seconds the child is sufficiently anesthetized to perform the incision and wakes promptly, usually in a pleasant state of mind. Ethyl chlorid, while technically more dangerous, is also satisfactory. Nitrous oxid is more inconvenient to give, but is generally satisfactory. As there is usually an acute respiratory infection present the use of ether has been thought by some to be contraindicated. I do not believe that, given as described above, there is any added risk by using ether.

*Local Anesthesia.*—Bonain's solution; equal parts of cocain, menthol and phenol, is about the best. Even this, however, does not ordinarily produce complete anesthesia. A minute fragment of cotton, loosely wrapped on the end of an applicator, is dipped into the solution. It is then removed from the applicator with a fine Hartman forceps and laid on the drum. Analgesia is produced in from twenty to thirty minutes. It is a poor policy that inflicts unnecessary pain on a young child, thereby making it intractable, not to consider the permanent results of psychic trauma. To attempt to perform a myringotomy without any anesthesia is beyond my conception of a physician's duty.

If spontaneous rupture occurs, one should carefully observe that drainage is adequate. Usually a myringotomy should also be done.

*Cleansing of the Ear Canal.*—It is essential that the canal be kept free of pus by some means that does not favor complications. Irrigation of the ear can be an agent for good or evil in the course of the disease. Inasmuch as it is the most used method, certain factors should be considered. Pressure applied by either plugging the canal or using too strong a stream may favor extension of the infection. Solutions should be sterile, isotonic, and the solution temperature should not be over 110 degrees Fahrenheit. The method I have found most practical for home treatment is the use of physiological salt solution with one per cent sodium bicarbonate introduced with a soft rubber ear and ulcer syringe. The mother is carefully instructed to straighten the canal by traction on the pinna. The tip is placed just within the meatus and a gentle stream is directed toward the drum. One or two syringefuls are enough to cleanse the canal of all pus. It is needless to say that the solution and syringe are sterilized by boiling.

*Dry Treatment.*—A small twist of sterile cotton wound on an applicator, and so that it projects beyond the end, is placed in the canal. The tip of the wick should be in contact with the drum. This is changed frequently, as often as every ten or fifteen minutes when the discharge is profuse. The more I use this dry treatment the less I think of irrigation, and I believe that it is better adapted for the promotion of drainage which, after all, is the end in view.

One must be on the alert for mastoid complications, but one should never become much concerned by symptoms pointing to mastoid inflammation until the middle ear has been adequately drained for forty-eight hours. It is not an uncommon occurrence to have retro-auricular

swelling in very young children, which completely subsides after adequately draining the middle ear by myringotomy. The early decision on mastoid operation without adequate middle ear drainage is certainly not in keeping with the honorable practice of our profession. When symptoms of mastoiditis persist after the middle ear has been properly cared for, surgical intervention may be indicated. By far the greatest number of actual mastoid infections get well by proper middle ear drainage, but when progress toward recovery stops, operation on the mastoid must be considered. Symptoms pointing toward intracranial involvement generally are indications for mastoidectomy.

In young children, ear infections associated with severe gastro-enteritis (Mariat's syndrome) bring about a most distressing condition and often a fatal termination. Here a rapidly performed antrotomy may save the child's life. A prolonged operation should not be considered and, fortunately, children of this age have only one or two mastoid cells, which can be drained in a few minutes with a turn or two of a curette.

Middle ear suppuration that persists for more than three weeks, even without appreciable systemic symptoms, demands a consideration of the mastoid condition. The determination as to whether mastoid drainage is necessary will require x-ray study in many cases.

Finally, it is my opinion that tonsil and adenoid surgery should not be undertaken while there is acute or subacute suppuration of the middle ear. I have observed several times a lighting up of complications that probably would not have occurred had the tonsil surgery been deferred.

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HOWARD W. FLEMING, M. D. (384 Post Street, San Francisco).—*Complications.* The complications of acute and chronic infections of the ear are serious. Though only a small percentage of the total number of patients with otitis media develop intracranial complications, the resultant mortality of such complications is high and, therefore, chronic running ear is to be considered a potential danger.

Yeager reports that 10 per cent of the patients with suppurative otitis media, entering Cook County Hospital, had intracranial complications. This high incidence probably is explained by the fact that only seriously ill patients were admitted to the wards. The most common complication was meningitis, which comprised five per cent of all cases in Yeager's series; sinus thrombosis accounted for three per cent; and brain abscess for two per cent. Labyrinthitis is a less common complication.

Prophylactic measures should receive the chief emphasis. No doubt this phase of the subject will be covered adequately by the otologists. I feel, however, that the menace of the chronic running ear is not appreciated by the profession as a whole, and certainly not by the laity.

Meningitis, the most frequent complication, is by far the most serious. Many otologists feel that a true meningitis of otitic origin is always fatal. In their opinion the recovery of a patient on whom

such a diagnosis was made is indicative of a mistaken diagnosis. This extremely pessimistic outlook is hardly justified in view of the many carefully observed patients who have survived. We certainly are not justified in withholding therapeutic efforts, even though the hope of recovery is extremely slight.

Unfortunately, cases of meningitis, brain abscess, and sinus thrombosis frequently do not present the classical textbook pictures. However, a careful examination usually will elicit some symptoms or signs that denote an intracranial complication. Headache, nausea, vomiting, and stupor are symptoms of increased intracranial pressure. Paresis, numbness, aphasia, incoördination and defects in the visual fields are significant localizing signs. The presence of Kernig's sign and stiff neck, in association with chills and fever, denotes an infectious intracranial process.

Given findings which indicate that some intracranial complication is developing, the following diagnostic procedures are of value in determining the site and nature of the disease process. The history of acute or chronic infection of the ear is a good lead as to the source of the infection, but one must not lose sight of the fact that there may be some other coexisting etiologic factor. Epidemic meningitis, pulmonary infection, nasal sinusitis, tuberculosis, and syphilis should be considered.

Very careful examination, particularly of the nervous system, often will give important localizing signs. These examinations, repeated frequently, will disclose signs that usually suggest and often confirm the diagnosis. Defects in the visual fields frequently are the determining factor in the diagnosis of abscess of the temporal lobe. Only too often this important diagnostic test is omitted while the patient is still coöperative.

As a rule the temperature, pulse and leukocyte count are increased markedly in cases of meningitis and sinus thrombosis, whereas brain abscess rarely causes marked general systemic reactions. Suggestive symptoms of septicemia indicate the necessity of blood cultures.

X-ray examinations frequently are helpful. Diseased mastoids or infected sinuses suggest the focus that must be eliminated. A lateral shift of the pineal shadow is diagnostic of a space-consuming lesion, probably an abscess, in the syndrome under consideration.

Spinal puncture is probably the examination of greatest value. The risk of medullary herniation or infection is minimal if the procedure is done carefully, and the value of the information obtained far outweighs the dangers involved. The intraspinal pressure should be measured carefully by means of a manometer. Estimation by the number of drops per minute, or the length and force of the stream, is inadequate. The pressure is increased in all the conditions under consideration, and a normal or low pressure is of negative value.

There is considerable debate as to the value of the Quackenstedt test in cases of sinus thrombosis. Questionable reactions may leave one in doubt, but evidence of block is strong confirmation of

sinus involvement. It is well to remember that, in a large percentage of people, the right lateral sinus and jugular vein convey a larger amount of blood, and an obstruction of this side is of more significance than one of the left side.

Laboratory examination of the fluid will determine the number of cells present and their type. Meningitis usually is characterized by a high cell count, ranging from a few hundred to several thousand. Brain abscess and sinus thrombosis, if uncomplicated, rarely show more than fifty cells. Only too frequently these conditions may be complicated by each other.

The demonstration of bacteria by stained smear or culture is the only criterion on which true meningitis can be diagnosed. The absence of bacteria, even in the presence of many cells, gives a much more hopeful prognosis. No doubt many of the cases of meningitis secondary to ear infection in which cure was obtained, were cases of sterile or serous meningitis.

The type of organism responsible for the infection influences the prognosis very materially. Tuberculous or pneumococcal meningitis is almost invariably fatal. Streptococcal or influenzal meningitis offers a somewhat better prognosis.

A detailed description of the treatment of meningitis, abscess, and sinus thrombosis is not practical. Very few surgeons agree as to the methods, and each case presents a problem of its own. Only a few general principles can be given here.

The focus of infection should be drained thoroughly as soon as possible. This usually requires a mastoidectomy. The clinical picture will suggest the necessity of adequate exposure of the lateral sinus, or the dura in the middle or posterior fossa. The pathologic changes disclosed at operation, in conjunction with the clinical picture, will determine the advisability of opening the sinus and tying the jugular vein, or exploring the brain for abscess.

Personally, I feel that in cases of true meningitis, lumbar drainage by frequent spinal puncture or laminectomy is in order after adequate drainage of the focus is obtained. I have seen patients with true meningitis, secondary to sinus or ear infection, recover when this method was employed. Also all patients for whom constant drainage was employed lived far longer and seemed to have a much better chance of survival than those patients treated without it.

The prognosis in brain abscess is far better. The type and virulence of the organism, and the ability of the brain to form a protective wall about the abscess, largely determine the prognosis. There is much discussion as to the methods of evacuating the abscess, but I think there is uniform agreement that the longer one can wait before instituting surgical interference the better is the outlook.

In conclusion, I wish to emphasize the prevention, if possible, of chronic suppurative disease of the ear; the proper care of such disease if present; the seriousness of intracranial complications and the desirability of their early diagnosis; and, finally, the necessity for active and sustained therapeutic effort in all such cases.